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Crater Resources, Inc.

Conshohocken, Pennsylvania

CERCLIS #PAD980419097

Site Exposure Potential

The 1.6-hectare Crater Resources, Inc. site is about 2 km west of the Schuylkill River in Conshohocken, Pennsylvania (Figure 1), in the Philadelphia metropolitan area. The Schuylkill River enters the Delaware River 36 km downstream from the site, and the Delaware River continues for about 85 km before reaching Delaware Bay.

The site was quarried for an undocumented period of time until its purchase by Alan Wood Steel, Inc. in 1918. From 1918 to 1978, the quarry was used for disposal of phenolic and tar wastes from the Alan Wood Steel coke and chemical works in nearby Swedeland. There is

only limited documentation on the quantities discharged, but during 1977, 230 m³ per day of wastes containing cyanide, phenol, and ammonia were discharged into the quarry via a fixed pipeline. For 50 years, over 3.5 million m³ of waste are calculated to have discharged to the quarry. In 1978, Alan Wood Steel sold the property to Alabama By-Products Corporation, which in turn sold the property to CRI and Gulph Mills Golf Course. From 1978 to 1980, the site was used for the disposal of untreated coke wastes, cooling water, and waste ammonia liquor at a rate of approximately 330 m³/day. Samples of sludge collected from the quarry in 1979 contained numerous phenolic compounds and PAHs.

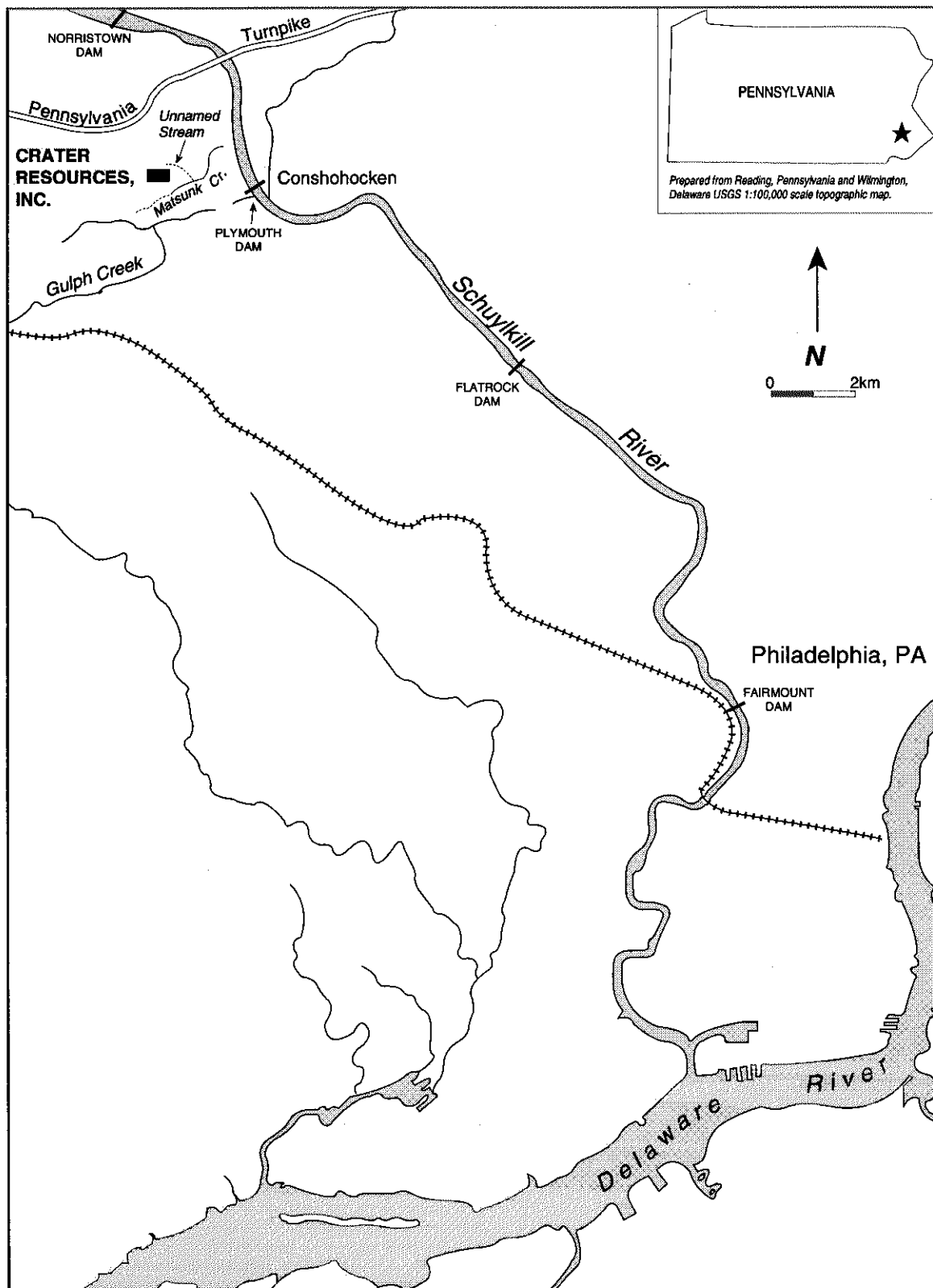


Figure 1. The Crater Resources, Inc. site in Conshohocken, Pennsylvania.

Groundwater and surface runoff are the potential pathways of contaminant transport from the site to NOAA trust resources and associated habitats. Soils in the area are of the Beltsville silt loam series and overlie a low-permeability, varied clay substance. The distance to the water table from the lowest point of waste disposal in the quarry was estimated to be 3 to 5 m (NUS 1983). The aquifer underlying the site consists of Conestoga Formation limestone; there are several other limestone formations near the site. These carbonate units can be quite permeable to groundwater due to karst features such as sinkholes and solution channels. Groundwater flows towards Matsunk Creek under natural conditions (NUS 1983). However, continuous groundwater pumping from nearby quarries north of the site has altered groundwater flow in the direction of the pumping. A small, unnamed stream, approximately 60 m northeast of the quarry, flows to the southeast and discharges into Matsunk Creek 1.5 km west of the Schuylkill River (NUS 1983). The Preliminary Assessment did not specify whether the lagoons in the quarry drain into the unnamed stream. Matsunk Creek flows toward the Schuylkill River but could not be traced on the U.S. Geological Survey topographical map (USGS 1983) closer than 0.5 km west of the river. It is likely that the creek enters culverts underneath a railroad area and enters the Schuylkill River at an undesignated location.

NOAA Trust Habitats and Species

The Schuylkill River is the habitat of concern to NOAA. Near the site, the river is a low-gradient, warmwater river, averaging approximately 1- to 2-m deep and 100- to 250-m wide. The Schuylkill River is considered the most heavily used water body for wastewater assimilation in Pennsylvania. There are also high levels of agricultural runoff to the river. Because of these factors, the river is generally considered to have low water quality (Soldo personal communication 1990; Kaufmann personal communication 1992). River substrate is predominantly gravel/cobble in riffle reaches and silt in pool reaches. There are heavy aquatic plant beds throughout the river, with the dominant plant species being Eurasian water milfoil (*Myriophyllum spicatum*) and pickerelweed (*Pontederia cordata*). There are no appreciable wetlands near the site (Kaufmann personal communication 1992).

Dam construction on the Schuylkill River eliminated natural anadromous fish migration into this reach of the river, which is corroborated by sampling data gathered between 1983 and 1984 (Soldo personal communication 1990). There are three dams on the Schuylkill River downstream from the site: Plymouth Dam (1.5 km), Flatrock Dam (10 km), and Fairmount Dam (22 km). Only Fairmount Dam has fish passage facilities. Because of legal and financial complexities associated with government ownership of Flatrock and Plymouth dams, scheduled improvements to these dams have been delayed and will probably

not be pursued for five to ten years (Ellam personal communication 1992). Restoration of the Plymouth Dam would involve breaching the structure. Restoration of the Flatrock Dam would involve installing fish ladders and hydraulic heads suitable for fish passage (Kaufmann personal communication 1990). The U.S. Fish and Wildlife Service stocks American shad above the Fairmount Dam as part of their Susquehanna and Delaware Basin Anadromous Fishery Restoration Projects, but this effort is not permanent (St. Pierre personal communication 1992). Due to limited information, it is not known whether NOAA trust resources use Matsunk Creek.

Catadromous American eel represent the only NOAA trust resource potentially at risk. American eel were found in upstream habitats north of the site during sampling in the Schuylkill River by the Pennsylvania Fish Commission in 1983 (Table 1; Kaufmann personal communication 1990; Soldo personal communication 1990). Flatrock Dam represents the furthest upstream point of migration for shad on the Schuylkill River (St. Pierre personal communication 1992).

A consumption advisory is in effect for the Schuylkill River due to high concentrations of PCBs, chlordane, and DDT. American eel are the only NOAA trust resources included in the advisory. Below the Flatrock Dam game limits are imposed for recreational landings of American shad, striped bass, white perch, and several warmwater species. No federally protected species are known to frequent nearby habitats of concern.

Site-Related Contamination

Results from a preliminary site investigation on May 9, 1983 indicate that groundwater in the vicinity of the site and surface water in the on-site lagoons contain elevated concentrations of site-related contaminants (NUS 1983). Trace elements are the primary contaminants of concern to NOAA trust resources. Maximum concentrations of trace elements detected in the groundwater

Table 1. Major NOAA trust species that use the Schuylkill River.

Common Name	Scientific Name	Spawning Ground	Nursery Ground	Adult Forage
CATADROMOUS/ANADROMOUS SPECIES				
American eel	<i>Anguilla rostrata</i>			♦
<u>Species with potential for restoration</u>				
Blueback herring	<i>Alosa aestivalis</i>	♦	♦	♦
Alewife	<i>Alosa pseudoharengus</i>	♦	♦	♦
American shad	<i>Alosa sapidissima</i>	♦	♦	♦
Striped bass	<i>Morone saxatilis</i>	♦	♦	♦

and surface water are presented in Table 2, along with freshwater chronic AWQC (U.S. EPA 1986). PAHs and other organic compounds were not detected in groundwater or surface water samples. Soil samples were not collected from the site, nor were surface water or sediment samples collected from the unnamed stream draining the area.

Eleven samples were collected during the preliminary site investigation (Figure 2). One groundwater sample was collected from each of three monitoring wells in the vicinity of the quarry. Maximum concentrations of copper, lead, mercury, and zinc in groundwater samples exceeded their respective screening guidelines by at least ten times (Table 2). One surface water and one solid material sample were collected from each of the four lagoons within the quarry. Maximum concentrations of lead, mercury, and zinc in surface water exceeded their respective screening guidelines. There were measurable concentrations

of arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc present in the solid material samples collected from the lagoons. PAHs were detected in solid material samples at a maximum concentration of 3,700 mg/kg (wet weight).

Summary

Several contaminants of concern to NOAA exceeded screening criteria in on-site samples of groundwater and surface water, and were also found in the one solid material sample. These contaminants included copper, lead, mercury, and zinc in groundwater; lead, mercury, and zinc in surface water, and arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver and zinc in the solid material. The Schuylkill River is the

Table 2. Maximum concentrations of trace elements detected in groundwater and surface water samples collected at the CRI site compared with ambient water quality criteria.

	Groundwater µg/l	Surface Water µg/l	AWQC ¹ µg/l
<u>Trace Elements</u>			
Copper	350	ND	12 ⁺
Lead	80	10	3.2 ⁺
Mercury	0.80	0.20	0.012
Nickel	1200	ND	160 ⁺
Zinc	7900	420	110 ⁺
1: Ambient water quality criteria for the protection of aquatic organisms. Freshwater chronic criteria presented (U. S. EPA 1986).			
ND: Not detected at method detection limit.			
+: Hardness-dependent criteria (100 mg/l CaCO ₃ used).			

nearest habitat known to be used by NOAA trust resources. Due to the presence of downstream dams, the American eel is the only NOAA resource that currently uses the river near the site. However, future plans to remove one of the dams and install a fish ladder at the other dam could open up the area to anadromous fish such as the American shad. While no data currently exist indicating that contaminants have migrated from the site to the river, potential pathways for such migration do exist in the form of groundwater and one creek.

Soldo, J., Fisheries Biologist, Pennsylvania Fish Commission, Revere, Pennsylvania, personal communication, July 11, 1990.

St. Pierre, D., Fisheries Biologist, U.S. Fish and Wildlife Service, Harrisburg, Pennsylvania, personal communication, August 25, 1992.

U.S. EPA 1986. *Quality criteria for water*. EPA 440/5-87-001. Washington, D.C.: Office of Water Regulation and Standards, U.S. Environmental Protection Agency.

USGS. 1983. Norristown Quadrangle, PA. 7.5 Minute Series. Washington, D.C.: U.S. Government Printing Office.

References

Ellam, J., Director, Department of Environmental Resources, Bureau of Dams and Waterway Management, Harrisburg, Pennsylvania, personal communication, August 21, 1992.

Kaufmann, M., Area Fisheries Manager, lower Delaware drainage and lower Susquehanna drainage, Pennsylvania Fish Commission, Revere, Pennsylvania, personal communications, October 2, 1989, October 16, 1989, June 8, 1990, and March 13, 1992.

NUS Corporation. 1983. Preliminary Assessment and Site Inspection of Crater Resources, Inc. Philadelphia: Hazardous Site Control Division, U.S. Environmental Protection Agency.